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An Essay

pretty good

Upon the Medical use

of Electricity Galvanism and Magnetism

presented to the Medical faculty

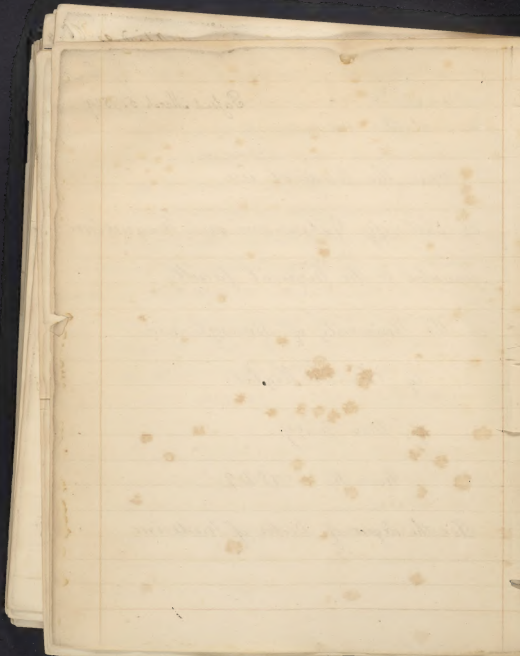
of the University of Pennsylvania

by Charles Higbee

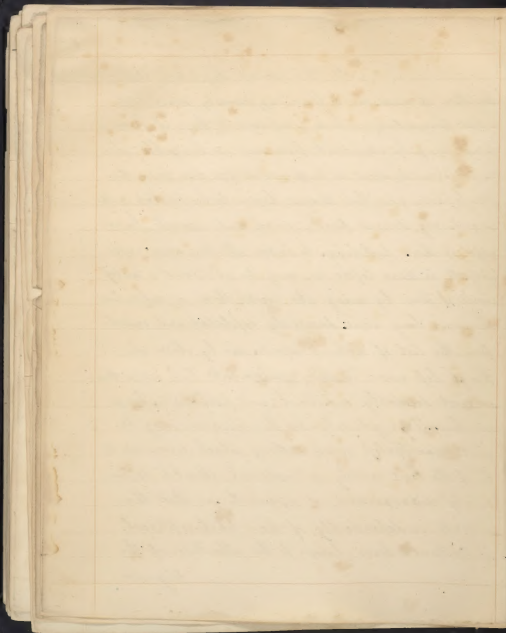
of New Jersey

March 1829

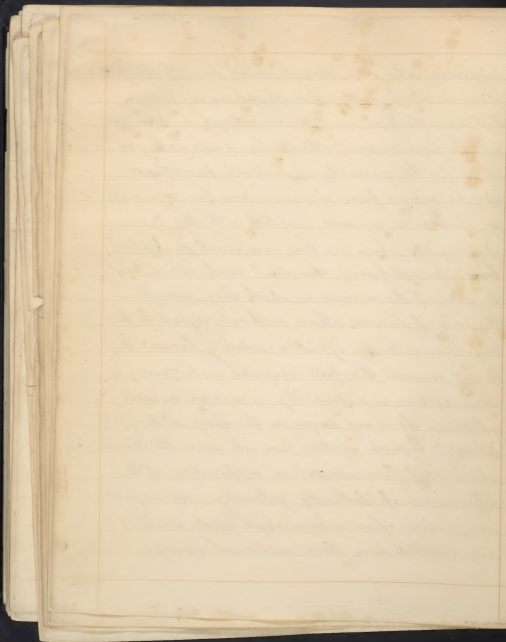
For the degree of Doctor of Medicine



At the present day, when the practice of medicine is becoming securely established, upon foundations, which compared to those of former times, may be considered firm and unchangeable; when empiricism is about to be discarded, for ever from the profession: now that diseases begin to be treated with a certainty, derived from a correct, and accurate knowledge, of their pathology. to bestow attention upon such subjects as those before us, may be considered a useless waste of time by many who regard them, as ridiculous chimeras long since deservedly exploded and erased from the list of medical agents, and by others who though less severe in their judgment look upon them as most decidedly empirical; and perhaps as far as our knowledge yet extends this opinion may be just; nevertheless since nothing which promises to be of the least utility in medicine, should be entirely disregarded, it appears to me that these subjects independently of their philosophical importance have claims to the attention of the physician.

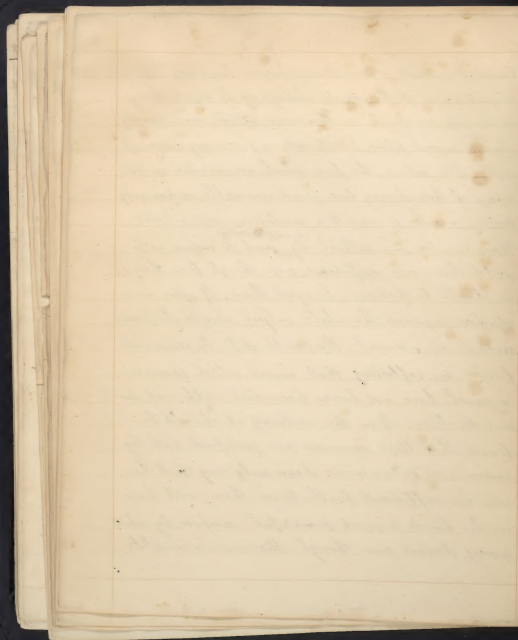


physician, who is willing to avail himself of all
 the aids which nature has placed in his powers.
 That due attention has not been bestowed on them and
 that they are viewed with apathy if not with con-
 tempt by the generality of medical practitioners
 may be inferred from observing how few ever make
 use of them or are even supplied with the means
 of doing it. Some are thus indifferent or skeptical
 because no satisfactory theoretical explanation can
 be given of the manner in which they operate, in
 the cure of diseases: others without regard to the-
 ory look with an eye of incredulity, because they
 do not consider the facts recorded in testimony of
 their agency as sufficiently numerous or well
 attested. It is my design in this essay, in the first
 place to enquire whether from all reasonable theories
 which have been adopted in explanation, of the
 phenomena of Electricity galvanism and magnet-
 ism; or from their acknowledged effects, we have
 any reason to deny their medicinal agency.



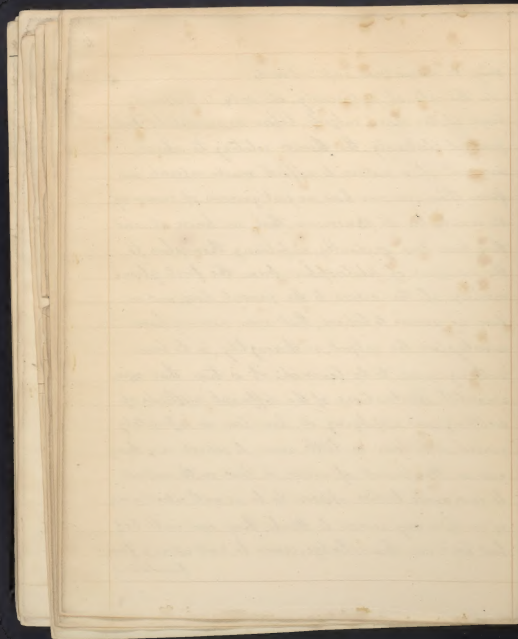
Or whether there is any thing in our knowledge, of physiology or pathology, to induce us to reject them as having no concern in the causes of life and disease.

In the second place I will seek as far as my means of information extend, the facts which are recorded in testimony of their having been found serviceable, in removing disease; in order to come to a conclusion, as to whether their number and authenticity ^(is sufficiently) great, to induce us to yield them our confidence, even though from theory, we should be disposed, to reject them. If after pursuing these inquiries the whole subject should be found indeed chimerical, there will still be some satisfaction, in reflecting, that means, which promised so much, have not been discarded without due consideration. If on the contrary it should be found, that these promises, are justified, both by reason and experience: I can only say that he, who has sufficient faith, to use them, will have in his hands a most powerful weapon, by which many diseases, even though otherwise invincible,



may be encountered, and subdued.

In the sake of perspicuity, it will be proper, to treat of the three subjects, before us, separately. And first of Electricity, the theories relating to which, are not of a nature, to afford much interest, and from them, we can have no just grounds of reasoning, it is only by its phenomena, that we know it, and those have been gradually, unfolding themselves, to the inquiries of philosophers, from the first glimmings, of the science, to the present day, and we have no reason to believe, that even now we have investigated the subject, so thoroughly, as to leave nothing more to be learned: it is true that experimental illustrations of the different methods of exciting, and applying it, have been so infinitely varied, as to leave us little room, to expect any thing new, in this point of view; its laws with respect to inorganic bodies, appear to be as well ascertained, as we have any reason to think, they ever will be; but here our knowledge, ceases to rest upon a firm foundation.



with regard to the nature of the spirit, and to the
 extent of its influence, upon organic or animal life,
 we know nothing with certainty, and all our con-
 jectures, are vague and unsatisfactory; but may we not hope,
 that time, and patient well directed research, will
 unfold to us, which is a kind of utility, and grandeur,
 that far exceeds all that is at present known and conceived,
 that the science, is still in its infancy: for it must be
 confessed that as yet, we have derived but little advan-
 tage from our knowledge, not beyond a few wise men,
 which please the eye, by their brilliancy, or astonish
 our imaginations, by their singularity, the science can
 boast, of having bestowed, but little real benefit, upon
 mankind: yet it cannot for a moment be supposed,
 that the great creator, has designed, so extraordinary
 a phenomenon, merely to astonish, or to terrify us: there
 must be, greater and nobler, ends, to be answered; and it
 is in physiology, pathology, and therapeutics, that we
 may reasonably hope, to find at least, a portion of it
 fully developed. It is true that as yet all hypo-
 theses,



which have been turned, to the purpose, of connecting
 Electricity, with the physiology and pathology, have been
 too wild, to merit serious consideration; yet we have
 grounds, to suspect, a connection, between them; but
 whether it is a mysterious subject, which we do not
 understand; whether it will always be so, rests with
 futurity to determine. In the mean time, it becomes
 us, to act and to reason, upon what we know.

Electricity, for a great length of time, has been
 on it, as a most important agent. its reputation has
 been raised between the extremes, of the most enthusi-
 astic admiration, and almost absolute contempt.
 the first kinds of its application, having been sug-
 gested, by its action upon those who were electri-
 fied, from accident or curiosity; it soon came into
 use, as a universal remedy; many real cures,
 were effected by it; and the intense inflammation
 in the patients, always attending, to increase its efficacy;
 its power soon began to be thought miraculous.
 this unmoderated reputation it continued to enjoy



for a time, suspected, by the fabrications, and false reports of those who found an interest in administering it. but at length many experienced, and learned physicians, having turned their attention, to the subject found, that the results, of many of their experiments, did not answer, their expectations; this led them to suspect, that all the accounts, which they had heard, were false or fanciful; and that they, as well as others had been deceived, after this Electricity, fell into universal discredit, among the profession, and if made use of at all it was only by a few ignorant empiricks. later trials however, and a better acquaintance with the science, have shown us, how far, we may confide, in its power over the human body; establishing, upon indisputable facts, - though Electricity, is not that admirable panacea, it was once considered: yet that when properly managed, and well directed, it is a harmless remedy, which sometimes, instantaneously removes, divers complaints, generally relieves, and
often



often perfectly cures, various disorders; some of which could not be removed, by the utmost endeavours, of Physicians and surgeons. That it should exercise such a contrivance, over diseases, ought not to excite any great astonishment, when we reflect that the action of most medical agents, is involved, in equally insuperable obscurity: all that we know, of them is that — may reasonably anticipate, certain results, from their administration. Because such results have been obtained, with tolerable certainty, in previous trials: we know that Antimony, will excite vomiting, that bark, will cure, an intermittent, that quina, will stop pain, that cantharides, will produce vesication. But how, these different effects, are produced, is a problem of which, there is no satisfactory solution. It seems however, to be pretty generally, admitted, that all substances, which have the power, of acting, on the human body, must do it, primarily, by stimulating, or exciting, the parts, with which they are in contact: and that



... but the inflammation of the ... is ...
 ... it is ... the ... the ...
 ... most frequently ... the ...
 ... with those which are more ...
 ... more ... it may ... the ...
 ... in ... to any of the ...
 ... Rheumatism, ...
 ... extensive ...
 ... atrophy ...
 ... the muscular ...
 ... is ...
 ... of electricity. Inquiring ... the nature, and
 treatment, of a few of these ... it will be seen,
 how far the foregoing ... is correct.

Rheumatism is thought by the best authorities to be
 an inflammatory affection, seated in the muscles &
 their appendages; it is accordingly managed, upon
 the general principles, established, for subduing
 inflammations; in its acute stage, all stimula-
 ting local applications, being of course avoided,

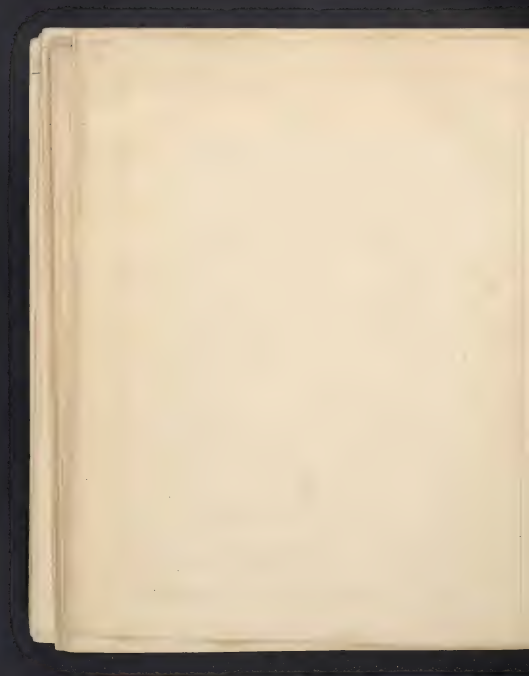


electricity, is entirely out of the question: in the
chronic stage, the chief dependance of the physician
appears to be upon a few specific articles, and in
the more numerous cases, upon a few more
variables, any farther than that they are to be
taken at night, enveloping the feet in warm covering
of flannel, or hot lentils, counteracting the frictions
and stimulating local applications, also all tend to excite them,
in the seat of the disease. Although this is the established
mode of treatment, it is well known, that the relief,
it affords, is very precarious, the complaint frequently
refusing to be mitigated by it in the slightest degree.
It is then that electricity, may be had recourse to, with
some prospect of advantage, nor is the rationale, of its
operation, more obscure than that of the preceding
remedies, most unquestionably a stimulant, its action
is so peculiar, so powerful, and so pervading, that
it may reasonably lay claim, to the title of a specific.
If we were to enter into speculation, upon the subject,
some account, of its mode of operating, might possibly be
suggested,



but as speculations are seldom valuable they may with propriety be here dispensed with.

In other inflammatory affections, as for instance in ophthalmia, the plan of treatment, ordinarily pursued, after it has begun to degenerate, into the chronic form, is by astringent washes, stimulating ointments or, upon this principle, electricity is peculiarly appropriate, for it seems to exercise a tonic power, without being in any great degree irritating. if inflammation be occasioned, by a loss of tone or vitality in the capillaries, of the affected part, which disables them from resisting, the force of the fluids driven on by the vigorous and healthy vessels, whereby they become congested and engorged we can easily imagine how electricity, by restoring them their tone, relieves them from congestion, and places them upon a par, with the healthy parts, of the system, nor is it assuming more than can be proved, to give to electricity a tonic power, for it may be made apparent to the sensation of every one that it can produce powerful tonic contractions



In the treatment of suppression of the menstrual discharge, medicines are given which are supposed to exercise a particular control over the uterus such as the cantharides and guaiacum but these in order to arrive at the part in which their action is to be developed are obliged to pass through others in which their presence, is injurious violent gastritis may be produced before cantharides shall have accomplished its purpose upon the uterus. from this objection electricity is exempt, exercising its specific influence immediately upon the part through which it is directed, others are left uninjured and the disease is cured without creating a worse.

If cancers are occasioned by a peculiar species of animalcules or hydatids as has been suggested, and sustained by numerous ingenious and forcible arguments, we shall have no difficulty in conceiving, how they are cured by electricity, for it is well known that many insects are destroyed by it, even when it is applied in quantities almost imperceptible - at any rate



since such is a condition in the nature of the
 it under ordinary means, except by means of
 various operations electricity has a clear claim
 to be used, and it may be observed that if it
 should be found efficient, it would furnish a
 strong argument in favour of the anatomical
 origin of the disease. Its a remedy for paralysis
 electricity does not appear to be entitled to our
 confidence, the authors who have turned their at-
 tention particularly to this subject declare that
 its power are very limited, rarely extending to
 long standing cases and not always to the worst
 form a consideration of its pathology, we should
 be led to the same conclusion, for not being a
 local disease it is not within the reach of local
 remedies (rather its location is not where its chief
 effects are visible). The more generally received
 opinion, however is that electricity is peculiarly
 suited to the cure of paralysis supposing
 it to be a mere loss of excitability in the mus-
 cles



muscles themselves, and knowing the power, to have
the power, of producing muscular contraction. It
thought that its failure in this instance, proves
its entire insufficiency, in other diseases and it
is rejected without farther trial. hence from
this erroneous opinion, has arisen in a great
measure the neglect of this valuable remedy.

It will not be necessary to dwell longer upon
this branch of the subject, enough has been said
to show that the medical use of electricity, is
not entirely without foundation in reason.
that experience sanctions it might easily be
shown by relating the cases of its successful
application which are recorded upon the autho-
rity of men, who were not likely to have been
themselves deceived, and who cannot be suspected
of willfully deceiving others. Franklin,
Cavalli, Adams, Sauvages, Manducy, Alibert &c
who have devoted much attention to the subject
and made frequent trials of its efficacy, admit

detail with much ^{minuter} numerous highly interesting cases, from which it would appear that no little reliance is to be placed upon it even under the most discouraging circumstances, the weight of evidence which they bring is extremely strong, and it must be admitted that the use of the remedy with their authority would be consistent with sound ~~and~~ ~~and~~ judicious practice.

It will next be proper to say a few words respecting the various methods of applying electricity, for considerable skill and attention will be requisite in order to adapt them to the case desired, it is by no means a matter of indifference whether the one or the other is resorted to, all the modifications will be found of importance, for instance when it is wished to excite a gentle and diffused stimulation throughout the system it may be done by exsultatory treatment, and connecting term with an excited



excited condition, thus giving rise more than
 the natural quantity of the fluid, in this situa-
 tion the fluid is quiescent, and the secretions
 are performed with more energy; if it should
 be desired to direct the stimulation to one part
 in particular, drawing the fluid from that
 part will have the effect. The manner of doing
 this will also be of importance, where the sub-
 ject of the operation is a very delicate organ
 as the eye by using a very fine metallic point,
 a small and continuous, stream may be drawn,
 which will give the least perceptible irritation,
 again if this should be insufficient a more
 copious, being left as it would draw a
 colder stream and in consequence stimulate
 more highly. This effect may be still further in-
 creased, by dragging sparks with a metallic ball
 held at a greater or less distance, and again,
 this may be modified, by interposing between the
 part to be operated upon, and the instrument, some



some slowly conducting substance as a piece of flannel; which will have a tendency, to render the action of the fluid more diffusive. Under certain circumstances, it would be dangerous to subject the patient to the treatment of insolation as where he is liable to apoplexy, an attack might be brought on, if in such a person, it should be desired to treat some local affection, by means of electricity, it would be more safe, to direct the fluid upon him, by any of the foregoing means, whilst he retains his connexion with surrounding conductors. the most energetic mode of administration, and the one which is most frequently resorted to is that of passing shocks through the diseased structures, in this operation, great care should be taken in order to regulate their strength, for injury may be done, by having them too powerful, and as they may be varied, almost ad infinitum, they become very extensively applicable. This hasty
 sketch

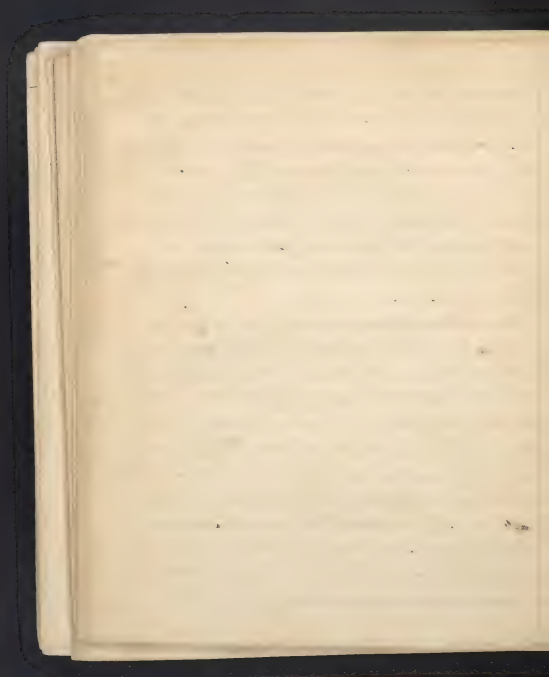


sketch of a few of the features of medical Electricity, may be here sufficient to treat it fully and to the extent it merits would require volumes. With regard to galvanism, it is so nearly allied to electricity, especially in a medical point of view, that it would be useless to enter into any separate detail, respecting it; whether there is any difference in the influence, which they exercise, upon the animal economy, is not easy to determine, it is not at all unlikely however that there ~~is~~ is, for the sensations produced by their respective shocks, are not entirely identical: some experiments also which have been made with galvanism, would seem to prove, a more close connexion with the animal functions, a galvanic series has been said to have reestablished, the communication between the cut extremities, of a nerve; and its effects, upon animals recently dead, is well known. In ~~a~~ practical importance however



Electricity must still stand highest, since it is susceptible, by means of its modifications, of being adapted to a greater variety, of circumstances, & is also, more conveniently applied. Yet it may possibly be hereafter discovered, that there is a peculiar power in galvanism, which will entitle it to superiority: the subject at any rate is one of great interest, and is well worthy of diligent inquiry.

Being intimately connected, with the foregoing subjects, in a philosophical ^{of giving} point of view, Magnetism—will also claim attention, as belonging to the same class, of therapeutical agents. What first suggested the idea of its medicinal powers, is not easy to conceive; differing, in this respect, from both electricity and galvanism, no evidence of activity is exhibited by its application to healthy structures, it is apparently, so inert, as respects the animal economy, that ordinary considerations, would not have led to its employment: most probably some substance



notions, of a supernatural agency, first invented it
 out, and afterwards reared a God, in a system
 of charlatanism, which succeeded for a time in
 deluding the world, under the auspices of Mesmer
 Perdon, and others, who with their metallic tractors,
 and animal magnetism, pretended to work miracles.
 But this mania, has subsided and has little to
 do, with the subject before us: The question is
 simply, whether the application of a magnet,
 to a part affected by disease, can have any effect,
 in removing, or allaying it. The affirmative might
 expose to superficial observation, both impossible and
 absurd, and if difficultly in explaining its operation,
 should be admitted, as a conclusive argument against
 it; it could not well be sustained, yet by the same
 mode of reasoning, we should have to doubt, that
 it points to the pole, or almost. And since they are
 equally difficult, of explanation, but repeated
 experiment has furnished convictions, in these lat-
 ter cases, and to this alone must be referred the
 human



by the test of experience, it must either stand or fall,
 and cannot be supported by authority.

The merits of the medical use of the magnets, have
 have been fully described, by Sharn, Astruc, and
 several others, and from the reasons it was
 was expected, made a reputation, by them, there
 is no great reason to believe, that success may be
 anticipated, from its use, in a variety of complaints
 usually denominated nervous. Mr. Lenoir has found
 it eminently serviceable, in a young heathen. And
 my own preceptor L. Belville of Lyons, has, in
 the course of a very extensive practice, for a great
 number of years, frequently found in it a simple,
 speedy, and efficacious, remedy, after other resources
 could be exhausted. He was first
 induced to make trial of it, on his own person, when
 more over-taken, being afflicted with sciatic pains,
 he applied a powerful magnet to the seat, and
 was surprised to find, in the course of a few



manner, that he was entirely relieved. he has since
 occasionally used it, in similar affections sometimes
 with the most conspicuous benefit, at others without
 the smallest. I have frequently heard him mention,
 the case of a gentle man, of great rest & calmness, who
 was for a long time, most grievously tormented with
 tic dolens, occurring at irregular intervals, and for
 which he had used electricity, with some transitory
 advantage. The doctor advised him to try the magnet.
 which he did upon the next attack, and found himself
 very soon completely relieved from pain, after this
 he continued to carry it in his pocket, and when
 ever he felt the pain return, an application of the mag-
 net never failed to dispel it. In an other instance it was
 recommended to a distinguished individual, residing
 near Dresden for a rheumatic affection, in the arms
 and legs, it was in some places applied, than he exclaimed
 that the pain was gone. he went out witnessing
 its wonderful effect. It is now no more for him
 it is his wife who was afflicted with a pain



in the head, across the eyes, and extending down the face, in this case also relief was afforded.

As to the authenticity of these, and many other similar accounts, there cannot be the smallest doubt. and however difficult it may^{be} to explain them, they are entitled, to the authority, of facts.

In conclusion, I must say, that from what I have read, heard, and seen, in relation to, Electricity, Galvanism, and Magnetism; they appear to me, worthy of being ranked, among the most valuable, and efficacious agents, of which the science of medicine, can boast. they afford ample room, for research, and are likely to reward, any labour which may be bestowed upon them, by the most brilliant and important discoveries.

